

**EFFECT OF DIFFERENT HEAT SETTING TEMPERATURES ON THE
PROPERTIES OF DYED AND UNDYED KNITTED POLYESTER FABRICS**

NAJIHAH BINTI ESA

**Final Year Project Submitted in Partial Fulfilment of the Requirements for the
Degree of Bachelor of Science (Hons.) Textile Technology in the Faculty of
Applied Sciences
Universiti Teknologi MARA**

JULY 2018

TABLE OF CONTENTS

ACKNOWLEDGEMENT	i
TABLE OF CONTENTS	ii
LIST OF TABLES	v
LIST OF FIGURES	vi
LIST OF ABBREVIATIONS	vii
ABSTRACT	viii
ABSTRAK	ix

CHAPTER 1 INTRODUCTION.....	
1.1 Background of Study.....	1-2
1.2 Problem Statement.....	2
1.3 Objectives of the Study.....	3
1.4 Significance of the Study.....	3
1.5 Scopes and Limitations.....	3
CHAPTER 2 LITERATURE REVIEW.....	
2.1 Overview.....	4
2.2 Methodology of Heat Setting Process.....	
2.2.1 Conduction.....	4-5
2.2.2 Convection.....	5-6
2.2.3 Radiation.....	7
2.3 Types of Fibres.....	
2.3.1 Blended fibres.....	7-8
2.3.2 Polyester.....	8-9
2.3.3 Polypropylene.....	9-10
2.3.4 Spandex/Lycra.....	10
2.3.5 Meta-Aramid.....	10-11

2.4 Effects of the Heat Setting Parameters on the Properties of Fabric.....	
2.4.1 Mass Per Unit Area.....	11
2.4.2 Colour Fastness.....	12
2.4.3 Bursting Strength.....	12-13
2.4.4 Thickness.....	13
 CHAPTER 3 METHODOLOGY.....	
3.0 Introduction.....	14
3.1 Materials.....	14
3.2 Chemicals.....	14
3.3 Apparatus and Equipment.....	15
3.4 Experimental Methods.....	
3.4.1 Heat Setting Process.....	15-16
3.5 Evaluation of Fabric Properties Prior to Heat Setting Process.....	
3.5.1 Fibre Identification by Burning Test.....	16
3.5.2 Fibre Identification by Solubility Test.....	16
3.5.3 Physical Properties of Fabric Samples.....	17
3.6 Evaluation of the Effect Heat Setting Process on the Properties of Fabric.....	
3.6.1 Fabric Thickness.....	17
3.6.2 Fabric Mass.....	17
3.6.3 Bursting Strength.....	17-18
3.6.4 Colour fastness to Perspiration.....	18
3.6.5 Colour fastness to Washing.....	18
3.6.6 Colour fastness to Crocking.....	18
 CHAPTER 4 EXPERIMENTAL RESULTS AND DISCUSSION.....	
4.1 Identification of Fibres.....	20
4.2 Physical and Mechanical Properties of Fabric Samples Before and After Heat Setting.....	21
.....	21
4.2.1 Fibre Count, WPI & CPI, Mass and Thickness.....	21-29

4.2.2 Bursting Strength.....	29-31
4.3 Spectrophotometer Analysis of Fabric Samples Before and After Heat Setting	
.....	
4.3.1 Colour of Fabric.....	32
4.3.2 Lightness, Colour, Whiteness Index.....	32-34
4.4 Color Fastness Properties of Fabric Samples Before and After Heat Setting.....	
4.4.1 Colour Fastness to Washing.....	35
4.4.2 Colour Fastness to Rubbing.....	36
4.4.3 Colour Fastness to Perspiration.....	37
CHAPTER 5 CONCLUSION AND RECOMMENDATIONS.....	38
CITED REFERENCES.....	39-42

ABSTRACT

The aim of this study is to analyse the effects of different heat setting temperatures on the properties of dyed and undyed knitted polyester fabrics. Specifically, the physical properties of the fabrics were evaluated in terms of fibre count, mass per unit area, wales and courses per inch and also fabric thickness. Meanwhile, the mechanical properties evaluated was the bursting strength of the fabrics. Two polyester fabric samples were selected one of which was dyed and the other one undyed. Subsequently, heat-setting process was conducted using three temperatures which were 160°C, 170°C and 180°C at a constant dwell time of 5 minutes followed by the analysis and gathering of data. The results from the heat-setting treatment done showed that the physical and mechanical properties of both dyed and undyed knitted polyester fabrics are mostly not affected by the different heat-setting temperatures used. However, there was a significant improvement in the colour fastness properties of the dyed fabrics and no yellowing effect was observed on the undyed fabrics. This paper can be improved by selecting fabric samples that have not undergone any kind of treatment in the industry so that the results are more consistent and reliable. The handling of fabric samples can also be improved as it may negatively affect the results. Future researchers can obtain raw fabric samples directly from a manufacturing factory before the samples are subjected to any kind of treatment.